



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/826,658	04/15/2004	Xiaoli Fu	13854-067001	9574
26181	7590	04/27/2005	EXAMINER	
FISH & RICHARDSON P.C. PO BOX 1022 MINNEAPOLIS, MN 55440-1022			CONNELLY CUSHWA, MICHELLE R	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 04/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/826,658

Applicant(s)

FU ET AL.

Examiner

Michelle R. Connelly-Cushwa

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 21-29 is/are pending in the application.
- 4a) Of the above claim(s) 12-15 and 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11, 16-19 and 21-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-19 and 21-29 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Election/Restrictions***

Newly submitted claim 29 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: New claim 29 is directed to a method for dispersion compensation, while elected claims 1-11, 16-19 and 21-28 are directed to a dispersion compensation module. Therefore, new claim 29 is a process of use for the product of elected claims 1-11, 16-19 and 21-28. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the method of dispersion compensation may be practiced with a dispersion compensation module that does not have a reflection etalon and/or a quarter-waveplate as required by elected claims 1-11, 16-19 and 21-28.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 29 has been withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Response to Amendment

Applicant's Amendment filed March 22, 2005 has been fully considered and entered.

Claim Objections

Claims 6 and 21 are objected to because of the following informalities:

Regarding claim 6; the claim is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 6 depends from claim 1 and claim 1 defines a "single polarization collimator" in line 2 of the claim.

Regarding claim 21; "polarizer" in line 2 of claim 21 should be --quarter-waveplate--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 16-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 16; the claim contains the limitation "the single polarization collimator coupled to the single polarization collimator" in lines 3-4 of the claim. This limitation is unclear because the single polarization collimator cannot be coupled to itself. Examiner suggests changing the limitation to --the first polarizer coupled to the single polarization collimator—to overcome this rejection.

Regarding claims 17-28; the claims inherently contain the deficiencies of any base or intervening claims from which they depend.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-7, 9, 11, 16-19, 21, 23, 24, 26 and 28 are rejected under 35

U.S.C. 102(e) as being anticipated by Colbourne et al. (US 6,804,467 B2).

Regarding claim 1; Colbourne et al. discloses a dispersion compensation module in Figures 5 and 5a, comprising:

- a single polarization collimator (101 and 121 form the single polarization collimator; see Figure 5a and column 9, lines 6-40);
- a polarizer (102) coupled to the single polarization collimator and having a first port, a second port, and a third port, the polarizer operable to receive a light beam (111) at the first port, having a single polarization, from the single polarization collimator, such that the entire light beam is directed from the first port to the second port;
- a reflection etalon (109) optically coupled to the second port of the polarizer ; and

- a quarter-waveplate (103) positioned between the reflection etalon and the second port of the polarizer.

Regarding claim 2; the dispersion compensation module is operable to apply a group delay profile to at least one optical signal.

Regarding claim 3; the polarizer (102) is operable to redirect a first optical signal having a first polarization input at the first port to be output from the second port and to redirect a second optical signal having a second polarization perpendicular to the first polarization at the second port to be output at the third port.

Regarding claim 4; the reflection etalon (109) is operable to apply a group delay profile to the first optical signal output from the second port.

Regarding claim 5; the quarter-waveplate (103) is operable to rotate a polarization of a first optical signal output from the second port by 45 degrees and allow the first optical signal to propagate toward the reflection etalon (109), the quarter-waveplate (103) for rotating a polarization of an optical signal reflected back from the reflection etalon (109) by a further 45 degrees into a second optical signal having a second polarization perpendicular to the first polarization and allowing the second optical signal to be input at the second port of the polarizer (102; see column 9, lines 6-40).

Regarding claim 6; the single polarization collimator (101 and 102 form the single polarization collimator) is coupled to the polarizer quarter-waveplate assembly.

Regarding claims 7 and 9; Colbourne et al. discloses that the device may comprise a tuner coupled to the reflection etalon, operable to adjust a resonant

Art Unit: 2874

frequency of the reflection etalon, wherein the tuner is a heater (see column 8, lines 58-62).

Regarding claim 11; Colbourne et al. discloses a dispersion compensation module in Figure 7 for applying a desired group delay profile to an input optical signal (111), the dispersion compensation module comprising:

- a plurality of etalon assemblies (the plurality of etalon assemblies being integrally formed), each etalon assembly for applying a group delay profile to an optical signal, each etalon assembly arranged so that the optical signal passes at least once therethrough, each etalon assembly comprising:
 - o a polarizer (one of the polarizing beam splitters, PBS, in the block of polarizing beam splitters, 302) having a first port, a second port, and a third port operable to direct an optical signal having a first polarization, input at the first port to be output from the second port and operable to direct an optical signal having a second polarization perpendicular to the first polarization, input at the second port to be output at the third port (the third port of the polarizer being at a side of the polarization beam splitter that is adjoined to another polarization beam splitter in the integrally formed block of polarization beam splitters, 302);

- a reflection etalon (the reflection etalons are integrally formed as etalon 109) arranged for application of a group delay profile to the optical signal output from the second port; and
- a quarter-waveplate (the quarter-waveplates are integrally formed as waveplate 103) located between the reflection etalon (109) and the polarizer (302), for rotating a polarization of the optical signal output from the second port by 45 degrees and allowing the optical signal to propagate toward the reflection etalon, the quarter-waveplate operable to rotate a polarization of the optical signal reflected back from the reflection etalon by a further 45 degrees such that the optical signal has a second polarization perpendicular to the first polarization and allowing the optical signal to be input at the second port of the polarizer; and
- a single polarization collimator (301) coupled to the first port of a polarizer (302) of the plurality of integrally formed etalon assemblies and operable to provide a light signal to the first port of the polarizer having a single polarization.

Regarding claim 16; Colbourne et al. discloses a dispersion compensation module in Figure 7, comprising:

- a single polarization collimator (301);

Art Unit: 2874

- a first polarizer (the first polarizer is the first polarizing beam splitter, PBS, in the block, 302, of polarizing beam splitters) having a first port, a second port, and a third port, the first polarizer being coupled to the single polarization collimator (301) at the first port and operable to provide an optical signal to the first port, having a single polarization, such that the optical signal is directed to the second port of the polarizer; and
- an etalon assembly pair optically coupled to the single polarization collimator (301), (the etalons of the etalon assembly pair are integrally formed), including:
 - o a first etalon assembly including;
 - the first polarizer (the first PBS of 302);
 - a first reflection etalon (the portion of etalon 109 adjacent the first PBS of 302);
 - a first quarter-waveplate (the portion of quarter-waveplate 103 adjacent the first PBS of 302) positioned between the reflection etalon and the second port of the polarizer; and
 - o a second etalon assembly including;
 - the second polarizer (the second PBS of 302) having a first port, a second port and a third port;

- a second reflection etalon (the portion of etalon 109 adjacent the second PBS of 302);
- a second quarter-waveplate (the portion of quarter-waveplate 103 adjacent the second PBS of 302) positioned between the reflection etalon and the second port of the second polarizer;
- wherein the third port of the first polarizer is coupled to the third port of the second polarizer via a QWP/mirror.

Regarding claim 17; the first polarizer (the first PBS of 302) is operable to direct the optical signal having a first polarization, input at the first port to be output from the second port and to direct the optical signal, having a second polarization perpendicular to the initial polarization, input at the second port to be output at the third port.

Regarding claim 18; the second polarizer (the second PBS of 302) is operable to direct the optical signal, having a first polarization, input at the third port to be output from the second port and to direct the optical signal, having a second polarization perpendicular to the first polarization, input at the second port to be output at the first port.

Regarding claim 19; the dispersion compensation module is operable to apply a group delay profile to at least one optical signal.

Regarding claim 21; the quarter-waveplate is operable to rotate an initial polarization of an optical signal output from a second port by 45 degrees and allow the optical signal to propagate toward each reflection etalon, the quarter-waveplate for

Art Unit: 2874

rotating a polarization of an optical signal reflected back from the reflection etalon by a further 45 degrees into an optical signal having polarization perpendicular to the initial polarization and allowing the optical signal to be input at a second port of each polarizer.

Regarding claim 23; a reflector (QWP/mirror) is coupled to the second etalon assembly.

Regarding claims 24 and 26; a tuner may be coupled to each reflection etalon and operable to adjust a resonant frequency of each reflection etalon, wherein the tuner is a heater (see column 8, lines 58-62).

Regarding claim 28; the device disclosed in Figure 7 of Colbourne et al. further comprises a plurality of integrally formed etalon assembly pairs, wherein a first port of each etalon assembly pair is coupled to a first port of another etalon assembly pair such that an optical signal can be directed to input at a first port of a first etalon assembly pair of the plurality of etalon assembly pairs and output at a first port of a last etalon assembly pair of the plurality of etalon assembly pairs.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8, 10, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Colbourne et al. (US 6,804,467 B2).

Regarding claims 8 and 25; Colbourne et al. discloses all of the limitations of claims 8 and 25 as applied above, except for specifically stating that the dispersion compensation device has a controller coupled to the or each tuner and operable to control the tuner. Colbourne et al. discloses that the etalon may be tuned with a heating element adjacent the etalon. Heating elements necessarily require a controller to at least turn the element on and off, as well as set a level of heat, to provide tunability. Therefore, one of ordinary skill in the art would have found it obvious to incorporate a controller in the invention of Colbourne et al. to operate the or each heating element for tuning the or each etalon device.

Regarding claims 10 and 27; Colbourne et al. discloses all of the limitations of claims 10 and 27 as applied above, except for specifically stating that the tuner is one or more electrodes. Colbourne et al. discloses that the tuner may be a heating element adjacent the etalon. Heating elements are commonly formed from electrodes in the art. Therefore, one of ordinary skill in the art would have found it obvious to incorporate an electrode in the invention of Colbourne et al., tuner, since electrodes are heating elements.

Allowable Subject Matter

Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art cited on the PTO-892 form attached to the prior Office action is the

most relevant prior art known, however, the invention of claim 22 distinguishes over the prior art of record for the following reasons.

Regarding claim 22; the claim is allowable over the prior art of record because none of the references either alone or in combination disclose or render obvious a dispersion compensation module as defined in claim 22, further comprising a single polarization collimator coupled to port one of each polarizer in combination with the other limitations of claim 22.

Hence, there is no reason or motivation for one of ordinary skill in the art to use the prior art of record to make the invention of claim 22.

Response to Arguments

Applicant's arguments with respect to claims 1-11, 16-19 and 21-28 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

Art Unit: 2874

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.


Michelle R. Connelly-Cushwa
Patent Examiner
April 20, 2005


AKM ENAYET ULLAH
PRIMARY EXAMINER